Michigan Educational Assessment Program

Grade 8

Erosion Investigation

Sample Completed Student Report Form

Name _____

School _____

Winter 2001

Erosion Investigation
Sample Responses

This information is provided by MEAP as a reference guide for the **Erosion Investigation**. The sample answers may not necessarily reflect your own work.

Question:

How does the amount of vinegar in a solution affect the breakdown of chalk?

Previous Knowledge:

Erosion is a process by which rock and soil are broken down.
Erosion occurs through both physical and chemical change processes.
Sometimes erosion can occur as a by-product of human activity.
The erosion of rock in nature is a relatively slow process.

Hypothesis:

Chalk can be broken down chemically by a weak acid solution. The extent of the breakdown of the chalk is directly related to the strength of the acid solution.

Materials (for each group of three to four students)**:**

1. **Erosion Investigation Student Report Form**
2. 3 clear 250 ml plastic beakers
3. 3 pieces of white chalk (80 to 100 mm long)
4. 200 ml of 5% vinegar
5. plastic device calibrated in milliliters for measuring volume of liquid
6. labels
7. stirring stick
8. tap water
9. marker or pen

Procedure:

1. Label each of the plastic beakers as either:

    - *All Water*
    - *Half Vinegar*
    - *All Vinegar*

2. Put:

    - 120 ml of water in the *All Water* beaker.
    - 60 ml of water and 60 ml of vinegar in the *Half Vinegar* beaker and stir gently.
    - 120 ml of vinegar in the *All Vinegar* beaker.

3. Simultaneously drop one piece of chalk, standing on end, into each of the three beakers. Part of the chalk is in the solution, part is above the solution.

4. Observe any immediate changes taking place on the chalk.

5. Continue to observe the chalk in the solutions for at least 30 minutes. Record observations in the observation chart.

Observations/Data/Evidence (graphs, tables, charts, notes)**:**

Erosion Investigation

Amount of Vinegar in Beaker	Amount of Bubbling (Reaction Rate)	Observed Erosion Effects
no vinegar	no bubbling	no sign of erosion
half vinegar	some bubbling	some wear of material, pitting
all vinegar	lots of bubbling	lots of wear of material, pitting

Conclusion (include reasons for your conclusion)**:**

Increasing the amount of vinegar in a solution increases the rate of breakdown of chalk. Water does not appear to chemically react with chalk.

Reasons:

The all water solution caused no observable breakdown of the chalk. The beakers with vinegar showed breakdown of the chalk. The all vinegar solution showed very rapid bubbling as soon as the chalk was added. The half water and half vinegar solution did not bubble as much as the all vinegar solution after immersing the chalk. The chalk in vinegar solutions showed visible sign of breakdown. The chalk in the water solution did not show any sign of breakdown. The chalk in the half water and half vinegar solution also showed visible sign of breakdown. However, the amount of breakdown in the half water and half vinegar solution was ***not*** as extensive as the breakdown of the chalk in the all vinegar solution.

Reasons for Error (error analysis)**:**

The temperature of the solution and chalk was not controlled. Perhaps this affected the rate of bubbling in all solutions.